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by which the warmer waters from the north replace the colder upper stratum which moves from the south. The temperatures naturally have a very narrow range, comprised within ten degrees of the point (28° F.) where sea water freezes.

The report on the pendulum observations is preceded by a short and pathetic account of the life and services of Lieutenant E. Danco, who died on the *Belgica*, at the age of twenty-nine years and to whom these observations had been confided. A fine portrait of Danco accompanies the notice. The work was carried on subsequently by Lecointe, but owing to a variety of circumstances the value of gravity was obtained by the expedition only at Punta Arenas in the Straits of Magellan.

In his discussion of the glaciers and bergs Arctowski considers first those of Tierra del Fuego, and secondly those of Gerlache Bay and the Antarctic lands. He concludes that the mountainous region of both was once continuous, the geology indicating much the same characteristics. He also contrasts the effect of the ice cap where incomplete and broken by nunataks, and when existing as a continuous covering extending to the sea level. In the latter case and for Antarctica generally he is disposed to believe that the ice is exercising a comparatively small abrasive function, and that its effect on the subjacent rock is very slight at present, the glacial streams being clear instead of milky and rock forms exposed by the retreating ice rounded off rather than channeled or excavated. This memoir is illustrated by numerous excellent half-tone plates derived from photographs.

The report on the barnacles considers a few Magellanic forms and one new truly Antarctic species, *Verruca mitra*, obtained in some 250 fathoms in south latitude 70°. Only one strictly Antarctic species was previously known, the *Scalpellum antarcticum* Hoek, obtained by the *Challenger*.

Only one species of Pennatulidæ was obtained on the expedition. This belongs to the genus *Umbellula* first described from the Polar Sea by Ellis from a dry specimen obtained in 1753. The *Belgica* species is *U. carpenteri* K  lliker, first obtained by the *Challenger*.

Two other species are known from the Antarctic, of which one is so close to the Arctic *U. encrinus* of Linn   as to be regarded by K  lliker as the same species.

Only two scaphopods were recognized by Plate in the collection, from south of latitude 70° S. One is referred to the *Dentalium majorinum* of Mabile and Rochebrune, variety *gaussianum*, previously described from material obtained by the Gauss expedition. The other, though probably a distinct species, was not sufficiently perfect for description.

The turbellarians comprised a new genus and species of Acoela, *Rimicola glacialis* B  hmig, and three species of Tricladida, of which one, *Procerodes hallezi*, is described as new. The latter is Fuegian, having been dredged in Beagle Channel. A new genus and subfamily are described to include *Procerodes* (now *Stummeria*) *marginata* Haller. The forms discussed are anatomically described and figured in great detail.

WM. H. DALL

*A Text-book of Mechanical Drawing and Elementary Machine Design.* By JOHN S. REID, Professor of Mechanical Drawing and Designing, Armour Institute, and DAVID REID, formerly Instructor in Mechanical Drawing and Designing, Sibley College, Cornell University. Revised edition, enlarged. Pp. xi + 433. New York, John Wiley & Sons. 1908.

It would be difficult, in fact practically impossible, to compress within equal limits more of service to the student of machine design who wished at the same time to qualify as a draftsman. Not only are all necessary proportions and tables given for the designing of screws, nuts, bolts, keys, cotters and gibs, riveted joints, shafting, pipes and couplings, bearings, belt and toothed gearing, valves and general engine details, but there are also full data for drafting courses, with the unusual feature of time-allotment included, securing the early attainment by the novice of a commercial rate of speed in his work.

As indicative of the methods and procedure in one of the leading technical schools the book is of especial interest to teachers of

drafting; while the student who must, by force of circumstances, be self-instructed, could not be better provided therefor.

The treatment of valve-motion is admirable. The precedence given the Bilgram diagram over the Zeuner, although unusual, is fully warranted, the former being far superior for designing, while possessing equal merits with the latter for analysis.

The frequent shaded perspectives will be especially appreciated by the beginner in machine drawing, obviating, as they do, in considerable degree, the necessity for the models recommended but not always obtainable.

Among the more important features appearing for the first time in this edition are the "Course in Lettering" and the "Present Practise in Drafting Room Methods," the latter a summary of replies, from two hundred of the leading engineering firms of this country, to thirty-five questions as to shop practise. An ample index completes this altogether valuable work.

FREDERICK N. WILLSON

#### SCIENTIFIC JOURNALS AND ARTICLES

THE February number (volume 15, number 5) of the *Bulletin of the American Mathematical Society* contains the following papers: "The Second Regular Meeting of the Southwestern Section," by O. D. Kellogg; "Remarks Concerning the Second Variation for Isoperimetric Problems," by Oskar Bolza; "Notes on the Simplex Theory of Numbers," by R. D. Carmichael; "The Solution of Boundary Problems of Linear Differential Equations of Odd Order," by W. D. A. Westfall; "A Class of Functions Having a Peculiar Discontinuity," by W. D. A. Westfall; "On Certain Determinants Connected with a Problem in Celestial Mechanics," by H. E. Buchanan; "Sylvester's Mathematical Papers," by L. E. Dickson; "Hilton's Finite Groups," by Arthur Ranum; "Shorter Notices": Ball-Freund's *Histoire des Mathématiques*, and Günther's *Geschichte der Mathematik*, by D. E. Smith; Tannery's *Manuscripts de Evariste Galois and Minkowski's Diophantische Approximationen*, by L. E.

Dickson; Sturm's *Lehre von den geometrischen Verwandtschaften*, Band II., by Virgil Snyder; Arnoux's *Arithmétique graphique*, by W. H. Bussey; Enriques-Fleischer's *Fragen der Elementargeometrie*, by H. E. Hawkes; Poincaré's *Leçons de Mécanique céleste*, by F. R. Moulton; Gutzmer *Tätigkeit der Unterrichtskommission*, by J. W. A. Young; "Notes"; "New Publications."

The March number of the *Bulletin* contains: "The Fifteenth Annual Meeting of the American Mathematical Society," by F. N. Cole; "The Winter Meeting of the Chicago Section," by H. E. Slaught; "The Sixteenth Meeting of the American Association for the Advancement of Science," by G. A. Miller; "Some Surfaces Having a Family of Helices as One Set of Lines of Curvature," by Eva M. Smith; "Note on Enriques's Review of the Foundations of Geometry," by A. R. Schweitzer; "Notes"; "New Publications."

#### SPECIAL ARTICLES

##### A POSSIBLE ERROR IN THE ESTIMATES OF THE RATE OF GEOLOGIC DENUDATION<sup>1</sup>

THE presentation at the Baltimore meeting of the American Chemical Society of a paper by Dole and Stabler on the rapidity of geologic denudation recalls attention to a possible source of error in such estimates which has been already implied in the writings of Walther, Udden and other students of æolian geology. The peculiarly thorough and comprehensive figures of Dole and Stabler are deduced, as have been all previous ones, from the examination of river waters, and are based upon the assumption that all material which is removed from the land to the sea is carried in suspension or solution by outward-flowing water. Recent studies on the magnitude of æolian transport cast some doubt upon the validity of this assumption. It has become apparent that much surface material is moved from place to place by æolian action and that much of this transport is to be ascribed to the slow and unnoticed, but continuous, action of

<sup>1</sup>Published by permission of the Secretary of Agriculture.